

Quiz #1

(1) Let $f : \mathbb{Z} \rightarrow \mathbb{Z}$ and $g : \mathbb{Z} \rightarrow \mathbb{Z}$ defined by

$$f(x) = x^2 - 6x, \quad g(x) = 3x + 8$$

a) [2 points] Find the range of g .

b) [2 points] Is g onto? Justify your answer.

c) [2 points] Is f one-to-one? Justify your answer.

d) [2 points] Find $g^{-1}(x)$.

e) [2 points] Find $(f \circ g)(x)$

Quiz #2

- (1) Define $*$ on \mathbf{R} by $a * b = a * b = a + b - 1$. Is $(\mathbf{R}, *)$ a group? Prove your answer.

Quiz #3

- (1) Use the Iteration or Substitution method to find the solution of the following recurrence relation.

$$a_0 = 1, a_n = 2a_{n-1} + 3, n \geq 1$$

Quiz #4

(1) Answer each of the following questions. Each question is independent.

(a) Let $a_0 = 0, a_1 = 1, a_n = 2a_{n-1} - a_{n-2}, n \geq 2$. Find a_2, a_3 , and a_4 .

(b) Write the general solution for a recurrence relation a_n that has the roots $2, 2, -3, -3, -3, 7$.

(c) What is the characteristic equation for the recurrence relation $a_n = 3a_{n-1} + n \cdot 2^n$.

Quiz #5

- (1) How many license plates can be made using either two letters followed by four digits or two digits followed by four letters?

- (2) How many ways to choose 2 drinks from 12 different drinks?

- (3) Find n when $P(n, 2) = 12$.